Mixture of multivariate t linear Mixed Models With Missing Information

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Abstract: Linear mixed-effects (LME) models have been widely used for longitudinal data analysis as it can account for both fixed and random effects, while simultaneously incorporating the variation on both within and between subjects. In clinical trials, some drugs may be more effective in Westerners than the Orientals. In this situation, such heterogeneity can be modeled by a finite mixture of LME models. The classical modeling approach for random effects and the errors parts are assumed to follow the normal distribution. However, normal distribution is sensitive to outliers and intolerance of outliers may greatly affect the model estimation and inference.

In this presentation, we propose a robust approach called the mixture of multivariate t LME models with missing information. To facilitate the computation and simplify the theoretical derivation, two auxiliary permutation matrices are incorporated into the model for the determination of observed and missing components of each observation. We describe a flexible hierarchical representation of the considered model and develop an efficient Expectation-Conditional Maximization Either (ECME) algorithm for carrying out maximum likelihood estimation. Simulation results and real data analysis are provided to illustrate the performance of the proposed methodology.